

# Rekenreks

## Encouraging Math Talks

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## 21<sup>ST</sup> CENTURY

### MATHEMATICS SKILLS NEEDED

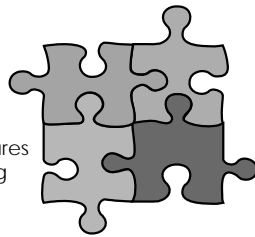
- Ability to reason about quantitative information
- Possess number sense
- Check for reasonableness of answers
- Discern whether numbers make sense
- Determine whether numbers are applicable to specific situations
- Communicate solutions to problems
- Compute accurately and efficiently



## CONCEPTUAL UNDERSTANDING

### DO THEY KNOW WHY?

"Our classrooms are filled with students and adults who think of mathematics as rules and procedures to memorize without understanding the numerical relationships that provide the foundation for these rules."

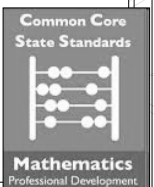


## UNDERSTANDING

## COMMON CORE

### STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.



## Math Talks

### What is a Math Talk?

- ❖ A method to elicit the thinking process students use for problem solving.
- ❖ Classroom conversations composed of purposefully crafted computation problems that are solved mentally.



## Standards of Mathematical Practice

### BENEFITS OF MATH TALK

1. Investigate and apply mathematical relationships (MP 2,3,7,8)
1. Consider and test other strategies to see if they make sense (MP 1)
1. Clarify thinking (MP 1,2)
1. Build a repertoire of efficient strategies (MP 1,3,5,8)
1. Make decisions about choosing efficient strategies for specific problems (MP 5,7,8)



## Math Talks



### Primary Goal of Math Talks...

- ❖ Computational Fluency = efficient and accurate methods for computing. When students demonstrate flexibility in the methods they choose, understand and explain these methods, and produce accurate answers efficiently.
- ❖ Numbers are composed of smaller numbers
- ❖ Numbers can be taken apart and combined with other numbers to make new numbers
- ❖ What we know about one number can help us figure out other numbers
- ❖ Numbers are organized into groups of tens and ones, hundreds...
- ❖ What we know about numbers to 10 helps us with numbers to 100 and beyond

## WHAT is a Rekenrek?

**Rekenrek** is a name for a small abacus-like math learning tool. The name came from a man who lived in the Netherlands. The name comes from two Dutch words:

Boekenrek – which is a book rack or shelf  
Rekenboek – which is a math book

“Reken” (pronounced as raken) means doing math or arithmetic. In English the equivalent verb would be “to reckon.”

The meaning of reckon is *to think*, including *to consider, imagine, suppose, feel, deem, guess, or surmise*.

Reckon can also mean to *calculate, add up, total, count or number*.

## WHY Rekenreks?

- Assist in conceptual understanding
  - Reason about numbers
  - Subitize
  - Build fluency
  - Compute using number relationships

## Subitize? Fluency?

### ●Subitize?

- See the quantity of

### ●Fluency?

- Knowing how a number is composed and decomposed
- Use the knowledge about a number
  - Allows flexibility and efficiency to solve problems



## WHAT is a Rekenrek?

- Math tool
  - Two rows of stringed beads
  - Repeating pattern of five beads of one color and five beads of another color on each row
  - Begin with first five colored beads to help students *subitize*
  - Use one row to build fluency to ten
  - Use two rows to build fluency to twenty

## Rekenrek Video Clip

### Number Talks Clip

- Number Talks: Helping Children Build Mental Math and Computation Strategies
  - By Sherry Parrish
  - Math Solutions, 2010

### Number Sense - 4

#### Sample Problems -Kindergarten

- A. 3 on top  
1 on bottom
- B. 1 on top  
3 on bottom
- C. 2 on top  
2 on bottom

- A. 1 on top  
3 on bottom
- B. 2 on top  
2 on bottom
- C. 4 on top  
0 on bottom

### Number Sense - 9

#### Sample Problems -Kindergarten

- A. 9 on top  
0 on bottom
- B. 8 on top  
1 on bottom
- C. 7 on top  
2 on bottom
- D. 6 on top  
3 on bottom

- A. 4 on top  
5 on bottom
- B. 3 on top  
6 on bottom
- C. 2 on top  
7 on bottom
- D. 1 on top  
8 on bottom

### Gr 1 Sample Problems

#### Sample Problems – Grade 1 Counting all / Counting On

- A. 9 on top  
3 on bottom
- B. 9 on top  
4 on bottom
- C. 9 on top  
5 on bottom

- A. 8 on top  
2 on bottom
- B. 8 on top  
4 on bottom
- C. 8 on top  
6 on bottom

### Gr 1 Sample Problems

#### Sample Problems – Grade 1 Doubles / Near - Doubles

- A. 5 on top  
5 on bottom
- B. 7 on top  
5 on bottom
- C. 5 on top  
5 on bottom
- D. 5 on top  
3 on bottom

- A. 6 on top  
6 on bottom
- B. 8 on top  
6 on bottom
- C. 6 on top  
6 on bottom
- D. 6 on top  
4 on bottom

### Gr 1 Sample Problems

#### Sample Problems – Grade 1 Making Tens

- A. 9 on top  
1 on bottom
- B. 9 on top  
3 on bottom
- C. 9 on top  
5 on bottom

- A. 7 on top  
3 on bottom
- B. 7 on top  
4 on bottom
- C. 7 on top  
5 on bottom

### Where to begin?

#### GETTING STARTED

- ☑ Limit the time to 5 - 15 minutes
- ☑ Start with smaller problems to solicit multiple strategies
- ☑ Suggest a strategy from a previous student if a student is having difficulty getting started
- ☑ Be patient as you implement Math Talks



## Math Talks

### 3...2...1...0 MATH TALK ESSENTIALS

1. Provide appropriate wait time for the majority of students to access the problem
2. Consider all answers; incorrect answers are OK
  - a. How did the student solve the problem?
  - b. Does it fit with the solution strategy?
3. Encourage student communication
4. Create a room environment that allows for informal observations and interactions
5. Anticipate potential strategies and student responses

## Math Talks

### KEY COMPONENTS



- Classroom environment
- Classroom discussions
- Role of the teacher
- Role of mental math
- Purposeful computation problems

## Math Talks

## Math Talks

### What Makes it a Math Talk as opposed to a Lesson?

- Understanding how numbers work, rather than learning various skills
- Empowers students to examine problems in their own way
- Short term practice toward long term goals
- Increase difficulty levels - encourage students to find more efficient ways to solve problems
- Never expect students to see the problem the teacher's way
- Not predictable
- Doesn't replace current curriculum or lesson; only 10-15 minutes of each day

## Results

### Seeing Change

- Students can solve more difficult problems than they anticipated.
- "I was really surprised what kids can do without any help from me at all...And even now when some of the kids tell you how they solve a problem, you have to admire that, because in your wildest dreams you wouldn't have thought about doing it that way."



Jennifer Beard, first-grade teacher  
Children's Mathematics, CGI (90)

## Resources

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